"BIRD Energy" Project Evaluation Form

Date: 10/12/2018
Name of Evaluator: David Walter

1.	**General Information**		
	Project Name:	**Distributed Energy Resource Management SW and Peer-to-Peer Trading**	
		U.S.	**Israel**
	Company Name:	The Solaria Corporation	Foresight Energy Ltd.
	People Interviewed – Optional (name/title):		

2.	**Budget**					
	Project duration (months)	**U.S. Company ($)**	**U.S. Company (%)**	**Israeli Company ($)**	**Israeli Company (%)**	**Total Budget ($)**
	24	990,996	46.2%	1,152,781	53.8%	2,143,777

3.	**Evaluation**		
	Area	**Rating***	**Explanation (expand as needed)**
	Business Potential	**C**	
	Technology	**D**	
	Capability of Companies	**C**	
	Benefit to IL/US companies	**B**	
	Overall Rating (weighted average)	**C**	
	* Rating: A = excellent, B = good; C=fair; D = problematic; E= recommend to reject		

4.	**Remarks** (if any)
	See comments below

5. **Comments** – (maximum three pages)

Evaluation procedure

Review of 67 page proposal application.

The Product and the Technology

The product proposed is a Photovoltaic (PV) plus Storage with a Home Energy Management System (HEMS) that will offer forecasting and peer to peer energy trading. There are multiple DOE funded projects to develop HEMS with PV+Storage. The proposal did not discuss the state of the art (SOA) in this area. The SOA discussion that was given focused entirely on the history PV and Storage cost decreases and standard net metering policies without discussing current research into HEMS algorithms or commercially available products. The proposed system does offer peer to peer energy trading through a blockchain, which is novel, but is also under development by multiple entities and is being piloted in Australia.

One of the major challenges with Home Management Systems are the ability to control devices from multiple manufacturers. This aspect was not discussed in the proposal.

The proposed technology will provide forecasted load of the customer, power production of the PV system, and market prices to drive decisions for use of generated power or use of arbitrage. This will be done by using limited real-time and historical data streams. There was minimal discussion towards the complexity and risks of determining power production or of market energy prices. There are currently multiple research programs developed to production forecasts on an appreciable spatial and temporal scale.

One of the required properties noted in E.1.1 is for an inverter efficiency of >99.0%. Solaria has recently partnered with Enphase to build their AC modules, which has an inverter efficiency of 97%. Obtaining their required efficiency of >99.0% would be significantly better than the state of the art and goals of current power electronics research projects.

Project Plan

Task provided make sense for development of this technology. The descriptions of sub-tasks and challenges are generic and don't seem to address the risks with the specific forecasting targets. For example, the accuracy challenges noted for power production are related to snow and soiling with only cursory mention of cloud cover / dissipation.

The Budget

The budget provided is realistic for the algorithm development and hardware integration.

The Market

There is a market for PV+Storage systems and it appears that peer to peer transactions will be made in the future. The discussion given for market size was based on the PV market and did not adequately address the storage aspect. Consumers in most markets (standard net metering) will mostly benefit from the resiliency aspect of storage (not addressed in any discussion) and will not be able to benefit from storing energy at peak production and selling later (a kWh at noon is worth the same at 7pm). The market for storage and arbitrage is on time of use rates or other tariff structures. Based on this, the proposal is likely overestimating their market potential.

It is hard to gauge the potential impact of peer to peer transactions without regulatory and market changes. This aspect of the technology can't be operated in the current US energy structure with residential customers.

Capabilities of the Companies

The team intends to develop a blockchain based trading platform and does not currently have a blockchain expert. This is a new technology and the largest challenge they have listed is the high computation resources needed.

The other Foresight team members noted are very experienced in the energy market but do not appear to have direct experience in solar or energy forecasting.

Production plans

All manufacturing will take place overseas.

Benefit to the U.S. Company

Stated benefits include high margin profit and new technology with high ROI. It is unclear that the high ROI is justified. There are US based companies that are developing HEMS and peer to peer technologies.

Benefit to the Israeli Company

This will offer access to the US market with a US based company.

Synergy between the Companies

The proposed work breakdown is complimentary to each companies capabilities.

Pros

Unique pairing of hardware and software focused companies to offer a complete package of PV+Storage with HEMS. These systems are currently individual components that are integrated by a developer.

Concerns

Lack of expertise in PV forecasting, HEMS, or block chain development. Overestimation of power electronics efficiency and market size also shows concerns.

Sincerely yours,
David Walter
Evaluator